REDESCRIPTION OF *BATHYGOBIUS ALBOPUNCTATUS* (VALENCIENNES, 1837) AND A NOTE ON ITS DISTRIBUTION

by

Menachem GOREN (1)

ABSTRACT. - *Bathygobius albopunctatus* (Val., 1837) is redescribed and a lectotype is designated. The species is characterized by pectoral fins with 17-20 rays. The upper four rays, partially free of membrane, are branched once, proximate to their base. D VI, I9, A I7-8. Interorbital space is narrower than eye diameter. There are 34-39 scales along the body, 16-22 predorsal scales which do not reach eyes and no scales on opercle and preopercle. Anterior and posterior oculoscapular canals are not connected. White spots are scattered on the head and form 6-10 irregular lines along the body, with 3-5 vertical rows on the pectoral base and on the proximate part of the fin. *B. albopunctatus* was recorded from the western Indian Ocean and from New Caledonia and Thursday Islands.

RESUME. - *Bathygobius albopunctatus* (Val., 1837) est décrit de nouveau et un lectotype est désigné. L'espèce est caractérisée par des nageoires pectorales à 17-20 rayons ; les 4 rayons supérieurs, dépourvus partiellement de membrane, sont bifurqués (1 seule fois) à proximité de leur base. D VI, I9 ; A I7-8. L'espace interorbital est plus étroit que le diamètre de l'oeil. Il y a 34-39 écailles le long du corps, 16-22 écailles prédorsales qui n'atteignent pas les yeux et pas d'écailles sur l'opercule et le préopercule. Les canaux oculoscapulaires ne sont pas reliés entre eux. Des points blancs sont dispersés sur la tête et forment 6-10 lignes irrégulières le long du corps, avec 3-5 rangées verticales sur la base de la pectorale et la partie proximale de la nageoire. *B. albopunctatus* est connu dans l'ouest de l'Océan Indien et en Nouvelle Calédonie, ainsi que dans les Thursday Islands.

Key Words: Gobiidae, *Bathygobius albopunctatus*, ISW West Indian Ocean, ISEW New Caledonia, Taxonomy.

Species of the genus *Bathygobius* Bleeker, 1878 are to be found in all the tropical seas, populating various shallow-water habitats, including tidal ponds. Gobies of this genus have a depressed head, a relatively low nomber of dorsal and anal segmented rays (8-11, 7-9 respectively), a moderate number of scales along the body (30-45), a scaled predorsal area, bilobed tongue, restricted gill opening, well developed fraenum and free and silklike upper pectoral rays (Herre, 1927; Koumans, 1953; Smith, 1959; Fowler, 1960 and others). However, these characters were found to be insufficient to distinguish *Bathygobius* from the other genera of the family. A modern diagnosis of the genus was given by Akihito and Meguro (1980). By assigning *Acentrogobius meteori* Klausewitz and Zander, 1967, Akihito *et al*. (1984) included in the genus a species with a low number of longitudinal scales (26-29) and without free pectoral rays.

The species of *Bathygobius* are very similar in many of the meristic counts as well as in their color pattern. The identification of the *Bathygobius* species therefore, is often a difficult task and the related literature is very confusing.

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(1) Department of Zoology, Tel-Aviv University, The George S. Wise Center for Life Sciences, 69978 Tel-Aviv, Israel.

Although a revision of the Japanese *Bathygobius* has been published recently (Akihito and Meguro 1980), there is no doubt about the need for a comprehensive revision of the genus. One of the "victims" of this confusion is *Bathygobius albopunctatus* (Val., 1837) which was found in the Indian Ocean. This species was considered by Koumans (1953), Smith (1959) and others to be a synonym of *Bathygobius fuscus* (Rüppell, 1828). The aim of this work is to establish the valid status of this species, to expand its original description and to designate a lectotype.

Counts and measurements

Standard length (SL) was measured from snout tip to the end of the hypural, total length (TL) from snout tip to the end of the caudal fin. The longitudinal scale count was taken from the upper attachment of the opercular membrane to the end of the hypurals. Transverse scale rows were counted from the insertion of the second dorsal fin. Predorsal scales were counted from the insertion of the first dorsal fin to the mid interorbital space. Counts of the lectotype are marked by an asterisk.

BATHYGOBIUS ALBOPUNCTATUS (Valenciennes, 1837) (Fig. 1)

Gobius albopunctatus Valenciennes *in* Cuvier and Valenciennes, 1837: 57.

Material

MNHN: Muséum National d'Histoire Naturelle, Paris.

Lectotype : MNHN 1044, Mauritius, leg. Desjardins, 1830, TL 79.9 mm, SL 61.4 mm, male; Paralectotypes: MNHN 1986-1062, Data as for the lectotype, TL 49.6 mm, SL 40.0 mm, male; MNHN 1400, Mauritius, leg. Péron and Lesueur, 1800-1804, Voyage of N. Baudin "le Géographe et le Naturaliste" TL 67.9 mm, SL 55.0 mm, female; MNHN 1401, Data as for MNHN 1400, TL 96.7 mm, SL 77.4 mm, male.

Additional measurements of the types are presented in Table I.

Non-typical material: MNHN A. 1342, 2 spec., Mauritius, Bosc, TL 79.7-106.0 mm, SL 64.2-86.9 mm, male + female; MNHN A.1341, 1 spec., ? Voyage de "la Bonite" (1836-1837) Eydoux, TL 77.5 mm, SL 64.2 mm, female; MNHN A.4894, 1 spec., New Caledonia, leg. Germain, 1882, TL 87.2 mm, SL 70.8 mm, female; MNHN A.4895, 1 spec., New Caledonia, leg. Germain, 1822, TL 79.2 mm, SL 64.1 mm, male; MNHN 8910, 2 spec. Sandwich Isl., leg. Ballieu, 1874, TL 80.0-94.6 mm, SL 65.0-75.8 mm, male; MNHN 8911, 1 spec., Sandwich Isl., leg. Ballieu, 1874, TL 95.6 mm, SL 77.7 mm, male; MNHN A.2179, 1 spec., Sandwich Isl., leg. Ballieu, 1877, TL 76.2mm, SL 62.4 mm, female (?); MNHN 1507, 1 spec., New Caledonia, don. from Musée des Colonies, 1863, TL 78.9 mm, SL 61.5 mm female; MNHN 1521, 2 spec., New Caledonia, don. from Musée des Colonies, 1863, TL 55.0-65.3 mm, SL 43.6-53.7 mm, female + male; MNHN 1891.716, 1 spec., Thursday Isl., leg. Lix, 1891, TL 58.3 mm, SL 48.5 mm, male; MNHN 1891.717, 1 spec., Thursday Isl., leg. Lix, 1891, TL 47.7 mm, SL 37.8 mm, male.

Diagnosis : *Bathygobius albopunctatus* is distinguished from all other species in this genus by a combination of the following characters: Pectoral fins with 17-20 rays; the upper four rays, partially free of membrane, are branched once, proximate to the base, the 5th and 6th rays are branched more than once. The secondary branchiation of the lower branch in the 5th and 6th rays is at the distal part. Interorbital space is narrower than eye diameter. There are 34-39 scales along the body, 16-22 predorsal scales which do not reach the eyes, and no scales on opercle and preopercle. The caudal fin bears 16-17 segmented rays, 14-15 of them branched. Anterior and posterior oculoscapular canals are not connected. Cephalic sensory system is presented in Figure 2.

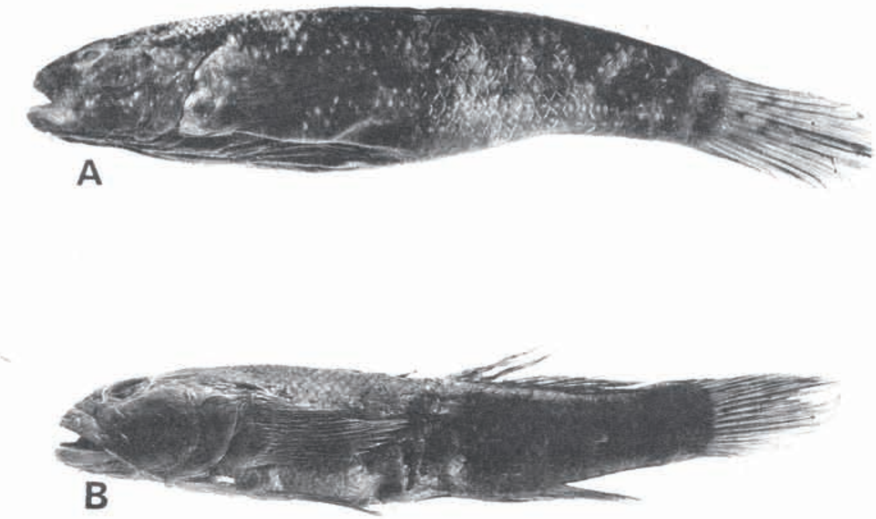
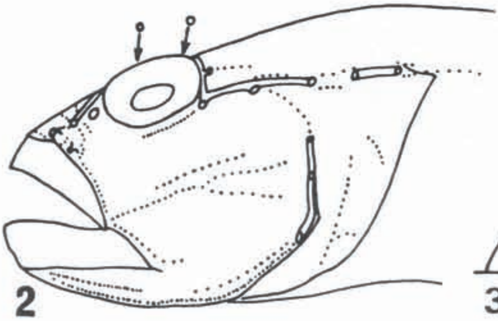


Fig. 1 : A : Lectotype of *Bathygobius albopunctatus* (Val., 1837) MNHN 1044 (64.1 mm SL); B : Paralectotype MNHN 1986-1062 (40.0 mm SL).

Table I : Measurements (in mm) of the types of *Bathygobius albopunctatus*

	Lectotype	**Paralectotypes**		
	MNHN 1044	**MNHN 1062**	**MNHN 1401**	**MNHN 1400**
Total length	79.9	49.6	96.7	67.9
Standard length	64.1	40.0	77.4	55.0
Body depth	13.8	6.7	14.4	11.8
Head length	17.8	10.1	22.8	15.0
Eye diameter	4.0	2.4	4.5	3.0
Interorbital length	3.5	1.5	4.0	1.8
Distance between snout tip and first dorsal fin	23.6	14.0	30.0	20.2
Distance between snout tip and second dorsal fin	35.5	20.8	44.1	29.6
Distance between snout tip and anal fin	38.4	22.3	49.0	33.5



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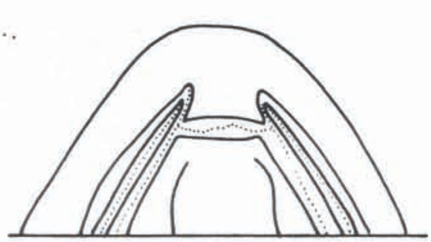

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Fig. 2 : Cephalic sensory system of *Bathygobius albopunctatus* .
Fig. 3 : Mental flap and ventral pit organ lines of *Bathygobius albopunctatus* .

White spots are scattered on the head and form 6-10 irregular lines along the body, with 3-5 vertical rows on the base and proximate part of the pectoral fin.

Description : Body elongated and compressed. Head slightly depressed and its upper profile convex. Mouth oblique. Maxillae reach to a vertical from mid eye. Anterior nostril, a short tube without a flap, above upper lip. Posterior nostril, a pore, in front of eye. There are 4-5 rows of teeth on each jaw, the outer and some of the inner enlarged. Tongue bilobed. Gill opening restricted, to below pectoral base. Gillrakers on anterior gill arch - 1+1+7; the 7th raker is very short. Cephalic lateral line system is presented in Figure 2. The shape of the mental flap and the ventral pit organ lines are shown in Figure 3. Body proportions are presented in Table II.

Fins: D VI, I+9; A I7(1)-I8(17); P 17-20. The number of pectoral rays is fewer (17) in the eastern populations (New Caledonia and Thursday Isl.) and higher in the western populations (see Table III). The pectoral fins are branched and the structure of the upper six rays is presented in Figure 4. Pelvic fins are connected by a membrane. The fraenum is well developed and its margin is smooth as shown in Figure 5. The caudal fin has 16(3)-17(15) segmented rays. The upper ray and the lower ray are simple.

Scales: 34-39 scales along the body; 12-14 scales in transverse series; 16-22 predorsal scales, not reaching eyes. More detailed counts are given in Table IV. The scales on predorsal area, pectoral base and belly are cycloid, the rest being ctenoid. The arrangement of the scales on the body is described in Figure 6.

Vertebrae: 27 including ural centrum.

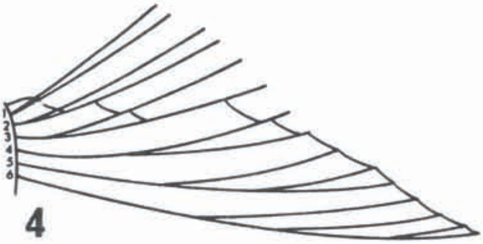
Color (preserved): Brownish body with large irregular black blotches on back and sides; lower part of the body yellowish. White spots are scattered on the head and form 6-10 irregular lines along the body, with 3-5 vertical rows on the base and proximate part of the pectoral fin. Black spots form three horizontal rows on dorsal fins and 4-5 vertical rows on caudal fin. Anal and pelvic fins colorless.

DISCUSSION

The distinction between most *Bathygobius* species is based on a combination of characters such as branchiation of upper rays of pectoral fin, pattern of squamation of predorsal area and head, shape of pelvic fraenum and mental flap, structure of the cephalic sensory system and coloration. In many cases, individual and geographical variations among the members of certain populations frequently cause confusion, which may result either in over-splitting of species or over-synonymy, as illustrated by the long list of synonyms for *B. fuscus* (Rüppell, 1828) given by Koumans (1953). The validity of the criteria used is the key for the

Table II. Selected body proportions of *Bathygobius albopunctatus* (n= 18).

Measurements	Range
Standard length (% of TL)	79.24 - 82.83
Head length (% of SL)	25.25 - 31.15
Body depth (% of SL)	16.75 - 21.84
Pelvic fin length (% of SL)	17.75 - 23.87
Distance between pelvic tip to the insertion of anal fin (% of SL)	7.20 - 10.85
Distance between snout and first dorsal fin (% of SL)	34.36 - 38.78
Distance between snout and second dorsal fin (% of SL)	52.00 - 56.99
Distance between snout and anal fin (% of SL)	55.75 - 63.63
Eye diameter (% of HL)	19.73 - 23.86
Interorbital width (% of HL)	12.00 - 19.66
Interorbital width (% of eye diameter)	55.55 - 87.50



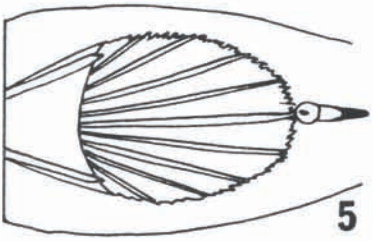


Fig. 4 : Six upper pectoral rays of *Bathygobius albopunctatus* .
Fig. 5 : Pelvic fin of *Bathygobius albopunctatus* .

Table III. Number of pectoral rays in *Bathygobius albopunctatus* (n = 17). * = Lectotype.

Number of rays	17	18	19	20
n	6	1	8*	2

Note : 17 rays were counted in all six specimens from New Caledonia and Thursday Islands.

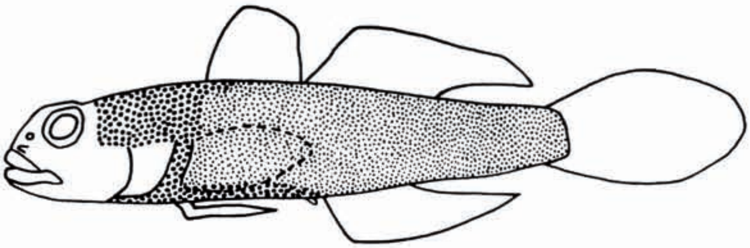


Fig. 6 : **Scales distribution on *Bathygobius albopunctatus*. (Large dots: cycloid scales; small dots: ctenoid scales).**

Table IV. Number of scales in *Bathygobius albopunctatus*. * = Lectotype.

Longitudinal series	n	34	35	36	37	38	39	
	15	2	6	3	2*	1	1	
Transverse series	n	12	13	14				
	13	8*	4	1				
Predorsal scales	n	16	17	18	19	20	21	22
	17	4	3	3	4	-	2*	1

identification of the species. If we accept the approach presented by Akihito and Meguro (1980) for separation between the species of *Bathygobius*, then *B. albopunctatus* is a valid species. The low number of pectoral rays of the eastern populations may be considered as a geographical variation. *B. cyclopterus* (Val., 1837) and *B. cotticeps* (Steindachner, 1880) can be distinguished from *B. albopunctatus* as the upper pectoral rays are branched more than once, the oculoscapular canal is continuous and the opercle is scaled (at least partially). *B. meteori* (Klausewitz and Zander, 1967) is easily recognizable as it possesses certain unique characters such as the low number of scales along the body (less than 30) and two black blotches behind the eyes. *B. cocosensis* (Bleeker, 1854) and *B. petrophilus* (Bleeker, 1853) differ from *B. albopunctatus* in possessing less than 16 predorsal scales which do not extend anteriorly to a vertical from the preopercle margin. *B. fuscus* differs from *B. albopunctatus* in having a fourth pectoral ray with secondary branchiation, upper pectoral rays less free and by a large blotch (or irregular wide band) on the first dorsal fin.

Winterbottom and Emery (1986) point out that *B. albopunctatus* is very similar to *B. padangensis* (Bleeker, 1851) and possibly identical. I have not examined the types of *B. padangensis*, but a comparison of the results of the present study with those published by Akihito and Meguro (1980) does not exclude this possibility.

A superficial examination of some specimens from the southern Red Sea can lead to the misidentification of *B. fuscus* as *B. albopunctatus* since it also possesses white (frequently shining) spots which form 6-10 lines along the body. However, the structure of the upper pectoral rays and the large black blotch on the first dorsal fin (see Akihito and Meguro, 1980) distinguish specimens as *B. fuscus*. Of several hundred samples including over a thousand fish of *Bathygobius* from the Red Sea examined in the fish collections of Tel Aviv University, The Hebrew University of

Jerusalem, Muséum National d'Histoire Naturelle, Paris and the Senckenberg Museum of Frankfurt (see partial list in Goren, 1978), I have not found any *B. albopunctatus*. This leads us to another aspect of the taxonomic problem - the recording of the distribution of the species. We may assume that the distribution of *B. albopunctatus* is much wider than it may be concluded from the works of Winterbottom and Emery (1986) and the present study, but only a comprehensive study of the Indo-Pacific *Bathygobius* material in all principal collections will enable an accurate distribution map of the species to be drawn up.

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